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REMARKS

In the Office Action, claims 1-17 and 19-21 were rejected. The Examiner objected to claim 18 but indicated that this claim would be allowable if rewritten in independent form including all of the limitations of the base claim. By the present Response, claims 1, 3-4, 7, 9, 11, 17-19 are amended. Upon entry of the amendments, claims 1-21 will remain pending in the present patent application. Reconsideration and allowance of all pending claims are requested in light of the above amendments and in view of the following remarks.

Rejections Under 35 U.S.C. § 112

The Examiner rejected claims 1-6 and 9-16 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter.

Claims 1-6

Independent claim 1 was rejected as being incomplete as to whether the reverse osmosis membrane "reconstitute the first stream" to produce a regenerant salt solution for reuse. Claim 1 has been amended to more clearly point out the claimed subject matter.

Amended claim 1 recites a water softener. The water softener includes a cation exchange resin tank fluidly coupled for discharging spent brine comprising monovalent and divalent ions and a fluid mixer valve coupled to the resin tank and to a water tank to dilute the spent brine to a desired concentration of a regenerant salt. Further, the water softener includes an ion-separation device fluidly coupled to the fluid mixer valve to receive the diluted spent brine and separate the diluted spent brine into first and second streams, the first streams substantially comprising monovalent ions and the second streams substantially comprising divalent ions and a reverse osmosis (RO) membrane

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fluidly coupled to the ion-separation device to receive the first stream from the ion-separation device for reuse as the regenerant salt.

Therefore, Applicants submit that independent claim 1 is allowable and respectfully requests the Examiner to reconsider rejection of the claim.

Claims 2-6 are further directed to the separation of the spent brine into the first and second streams through the arrangement of claim 1. By the present response, Claim 3 has been amended to more clearly point out the claimed subject matter. As claims 2-6 depend from claim 1, Applicants submit that these claims are similarly allowable for at least the reasons set forth above with respect to claim 1.

Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 7-8 and 16 under 35 U.S.C. §103(a) as being unpatentable over Brigano et al (US Patent No. 5,256,257), hereinafter Brigano. Claims 17 and 19-21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Brigano in view of Hassan (US Patent No. 6,508,936), hereinafter Hassan and Guillhen (US Patent No. 4,806,244), hereinafter Guillhen.

Claims 7-8 and 16

Amended Claim 7 recites a water softener that includes a cation exchange resin tank fluidly coupled for discharging spent brine comprising monovalent and divalent ions and a fluid mixer valve coupled to the resin tank and to a water tank to dilute the spent brine. The water softener also includes an ion-separation device fluidly coupled to the fluid mixer valve to receive the diluted spent brine and separate the diluted spent brine into first and second streams, the first stream substantially comprising monovalent ions and the second stream substantially comprising divalent ions.

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The Examiner admitted that Brigano does not disclose the addition of water for diluting the brine. Further, the Examiner stated that Brigano discloses the apparatus provided with a structure for adding water to the system before the first nanofiltration membrane.

Applicants submit that Brigano teaches the regeneration of spent brine with nanofiltration and recirculation of the regenerated brine. However, Brigano does not teach a fluid mixer valve coupled to the resin and to a water tank to *dilute the spent brine*. The Examiner stated that it would have been obvious to one skilled in the art at the time the invention was made to dilute the brine when the concentration of the recycled brine does not meet the required concentration for the ion exchange regeneration.

Applicants submit that the present invention teaches the dilution of the spent brine to *facilitate operation below the solubility limit of the precipitating salts to control the precipitation*, thereby preventing the scale formation that is formed due to the presence of high concentration of calcium and/or magnesium that is removed during regeneration of the water softener with the brine. In contrast, Brigano employs acidification of the spent brine for controlling the precipitation and preventing scale formation during nanofiltration of the spent brine to remove the divalent ions and does not teach dilution of the spent brine prior to separation of the spent brine into first and second streams.

Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art at the time the invention was made to employ dilution of the spent brine rather than acidifying the spent brine to control the precipitation and scale formation. Therefore, for at least these reasons Applicants submit that independent claim 7 is allowable and respectfully request the Examiner to reconsider rejection of the claim. Further, as claims 8 and 16 depend from claim 7, Applicants submit that these claims are similarly allowable for at least the reasons set forth above with respect to claim 7.

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Claims 17 and 19-21

Amended claim 17 recites a method for purifying and recycling spent brine in a water softener. The method includes discharging from a cation exchange resin tank spent brine comprising monovalent and divalent ions and diluting the spent brine to a desired concentration of a regenerant salt. The method also includes separating the diluted spent brine into first and second streams, the first stream substantially comprising monovalent ions and the second stream substantially comprising divalent ions.

As discussed with reference to claim 7, Brigano teaches the acidification of the spent brine for controlling the precipitation and preventing scale formation during nanofiltration of the spent brine to remove the divalent ions. However, Brigano does not teach dilution of the spent brine to *facilitate operation below the solubility limit of the precipitating salts to control the precipitation* prior to separation of the spent brine into first and second streams having monovalent and divalent ions respectively. Rather, Brigano employs *acidification* of the spent brine for controlling the precipitation and preventing scale formation during nanofiltration of the spent brine.

Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art at the time the invention was made to employ dilution of the spent brine rather than acidifying the spent brine to control the precipitation and scale formation. Further, Hassan and Guillhen do not cure the deficiencies set forth above with respect to claim 17. Notably, that the spent brine is diluted to a desired concentration of a regenerant salt prior to separation of the spent brine into first and second streams through the nanofiltration membrane. As claims 19-21 depend directly or indirectly from claim 17, Applicants submit that these claims are allowable for at least the reasons set forth above with respect to claim 17.

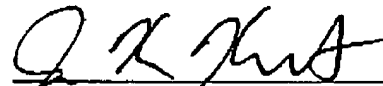
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Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Date: 5/19/06



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